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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/045,128	10/26/2001	Manjunath Narayanaswamy	ADAPP206	2461

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EXAMINER	
VITAL, PIERRE M	
ART UNIT	**PAPER NUMBER**
2188	5

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/045,128	NARAYANASWAMY ET AL.	
	Examiner	Art Unit	
	Pierre M. Vital	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-8,10-14,16-18 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-8,10-14,16-18 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to applicant's communication filed February 2, 2004 in response to PTO Office Action mailed October 27, 2003. The Applicant's remarks and amendments to the claims and/or the specification were considered with the results that follow.

2. Claims 1-20 have been presented for examination in this application. In response to the last Office Action, claims 1, 7, 12 and 17 have been amended. Claims 3, 9, 15 and 19 have been canceled. No claims have been added. As a result, claims 1,2,4-8,10-14,16-18 and 20 are now pending in this application.

3. The objection to the specification has been withdrawn due to the amendment filed February 2, 2004.

4. The previous rejection of claims 1-20 in the Office Action mailed October 27, 2003 (Paper No. 3) has been withdrawn due to the amendment filed February 2, 2004. New grounds of rejection follow herewith.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 2, 4, 7-8, 10-14, 17, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeffries (US5,974,544) and McDonald et al. (US6,138,176).

As per claim 1, Jeffries discloses a method for merging contiguous like commands for transfers between a storage medium and memory, comprising: accumulating a plurality of commands in a queue while a first command is being processed by the storage medium [*pending requests are maintained in a queue and a request must complete prior to starting the next*; col. 12, lines 24-28]; examining the plurality of commands in the queue while the first command is being processed , the examining further including, checking if any of the plurality of commands are like commands [*related sequences of atomic operations are kept together*; col. 5, lines 7-13], each of the like commands corresponding to a file stored on a storage medium; and determining if any of the files on the storage medium are stored contiguously with respect to one another [*reads to contiguous disk blocks are combined*; col. 29, lines 49-50; *if a new read comes adjacent to the last n, sequential read may be in progress*; col. 7, lines 53-57; *controller 100 provides a sorting of the queue of requests if two or more requests involve close proximity sectors*; col. 70, lines 52-59]; combining the like commands corresponding to contiguous files as a combined command [*reads to contiguous disk blocks are combined into one disk read*; col. 29, lines 49-50]; and issuing the

combined command to the storage medium upon completion of the processing of the first command [*a request must complete prior to starting the next*; col. 12, lines 26-28].

However, Jeffries does not specifically teach each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium, the SGL being configured to include data pointers; and examining the CDB and SGL as recited in the claim.

McDonald discloses each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium [col. 5, lines 8-18], the SGL being configured to include data pointers; and examining the CDB and SGL [col. 9, lines 40-43; col. 10, lines 1-4] for providing a high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation (col. 17, lines 36-41). Since the technology for implementing a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) was well known, and since a command data block (CDB) and a scatter gather list (SGL) provides a high degree of performance, an artisan would have been motivated to implement a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) in the system of Jeffries. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) because a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) were well known to benefit with providing a

high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation as taught by McDonald.

As per claim 2, Jeffries discloses the storage medium is a hard drive [*accessing a byte stored in a hard disk drive*; col. 2, lines 22-45].

As per claim 4, Jeffries further discloses providing a multithread environment, the multithread environment allowing multiple read and write commands to be processed concurrently [*multiple outstanding I/Os occur concurrently on each logical drive*; col. 29, lines 13-15].

As per claim 7, Jeffries discloses a method for combining commands for data transfer between a drive and memory, comprising: receiving multiple read or write commands in a queue [*pending requests are maintained in a queue*; col. 12, line 24]; processing a first command of the multiple read or write commands [*requests are handled serially and a request must complete prior to starting the next*; col. 12, lines 24-28]; examining the multiple read or write commands, the examining including, identifying like commands of the multiple read or write commands while processing the first command [*related sequences of atomic operations are kept together*; col. 5, lines 7-13; *pending requests are maintained in a queue and a request must complete prior to starting the next*; col. 12, lines 24-28]; each of the like commands being associated with a file stored on the drive, and ascertaining which of the files associated with the like commands are contiguous files [*reads to contiguous disk*

blocks are combined; col. 29, lines 49-50; *if a new read comes adjacent to the last n, sequential read may be in progress*; col. 7, lines 53-57; *controller 100 provides a sorting of the queue of requests if two or more requests involve close proximity sectors*; col. 70, lines 52-59]; creating a combined command, the combined command being configured to consolidate the identified like commands being associated with contiguous files [*reads to contiguous disk blocks are combined*; col. 29, lines 49-50]; and issuing the combined command to the drive [*a request must complete prior to starting the next*; col. 12, lines 26-28].

However, Jeffries does not specifically teach each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium, the SGL being configured to include data pointers; and examining the CDB and SGL as recited in the claim.

McDonald discloses each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium [col. 5, lines 8-18], the SGL being configured to include data pointers; and examining the CDB and SGL [col. 9, lines 40-43; col. 10, lines 1-4] for providing a high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation (col. 17, lines 36-41). Since the technology for implementing a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) was well known, and since a command data block (CDB) and a scatter gather list (SGL) provides a high degree of performance, an artisan would have been motivated to implement a plurality of commands including a

command data block (CDB) and a scatter gather list (SGL) in the system of Jeffries. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) because a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) were well known to benefit with providing a high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation as taught by McDonald.

As per claim 8, Jeffries further discloses providing a multithread environment, the multithread environment allowing multiple read and write commands to be processed concurrently [*multiple outstanding I/Os occur concurrently on each logical drive*; col. 29, lines 13-15].

As per claim 10, Jeffries discloses the queue has a capacity of 256 commands [*the controller has 256K of RAM*; col. 7, lines 20-21].

As per claim 11, Jeffries further discloses processing the combined command and generating one interrupt for the processed combined command [*upon completion of the transfer, the event completion interrupt is serviced*; col. 22, lines 64-67].

As per claim 12, Jeffries discloses an apparatus for merging contiguous like commands, comprising an operating system, the operating system generating read and write commands [*CPU is operating in a multiprogramming environment and generates read/write requests*; col. 3, lines 14-30]; a storage media, the storage media being configured to

process read and write commands [*this allows parallel writes by the disk drives*; col. 3, lines 15-16], the read and write commands being associated with files stored on the storage media [*read or write requests access to stripes of sectors*; col. 46, lines 50-58]; and a driver queue, the driver queue being configured to receive the read and write commands from the operating system [*request is enqueued on the disk driver's queue or the transfer driver's queue*; col. 21, lines 46-52], the read and write commands being examined in the driver queue to identify like commands associated with contiguous files on the storage media [*reads are enqueued in the disk driver's queue and writes are enqueued in the transfer driver's queue*; col. 21, lines 48-50; *if a new read comes adjacent to the last n, sequential read may be in progress*; col. 7, lines 53-57; *controller 100 provides a sorting of the queue of requests if two or more requests involve close proximity sectors*; col. 70, lines 52-59], the identified commands being, combined into one command [*reads to contiguous disk blocks are combined*; col. 29, lines 49-50], the one command being issued to the storage media [*a request must complete prior to starting the next*; col. 12, lines 26-28].

However, Jeffries does not specifically teach each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium, the SGL being configured to include data pointers; and examining the CDB and SGL as recited in the claim.

McDonald discloses each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium [col. 5, lines 8-18], the SGL being configured to

include data pointers; and examining the CDB and SGL [col. 9, lines 40-43; col. 10, lines 1-4] for providing a high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation (col. 17, lines 36-41). Since the technology for implementing a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) was well known, and since a command data block (CDB) and a scatter gather list (SGL) provides a high degree of performance, an artisan would have been motivated to implement a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) in the system of Jeffries. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) because a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) were well known to benefit with providing a high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation as taught by McDonald.

As per claim 13, Jeffries discloses the storage media is a hard drive [*accessing a byte stored in a hard disk drive*; col. 2, lines 22-45].

As per claim 14, Jeffries discloses further including: a multithread environment, the multithread environment allowing for multiple combined commands to be processed concurrently [*multiple outstanding I/Os occur concurrently on each logical drive*; col. 29, lines 13-15].

As per claim 17, Jeffries discloses combining commands for data transfer between a drive and memory, comprising: receiving multiple read or write commands in a queue [*pending requests are maintained in a queue*; col. 12, line 24]; processing a first command of the multiple read or write commands [*requests are handled serially and a request must complete prior to starting the next*; col. 12, lines 24-28]; combining multiple read or write commands [*reads to contiguous disk blocks are combined into one disk read*; col. 29, lines 49-50], the combining including, identifying like commands of the multiple read or write commands while processing the first command [*related sequences of atomic operations are kept together*; col. 5, lines 7-13; *pending requests are maintained in a queue and a request must complete prior to starting the next*; col. 12, lines 24-28], each of the like commands being associated with a file stored on the drive, ascertaining which of the files associated with the like commands are contiguous files [*if a new read comes adjacent to the last n, sequential read may be in progress*; col. 7, lines 53-57; *controller 100 provides a sorting of the queue of requests if two or more requests involve close proximity sectors*; col. 70, lines 52-59]; creating a combined command, the combined command being configured to consolidate the identified like commands being associated with contiguous files [*reads to contiguous disk blocks are combined*; col. 29, lines 49-50]; issuing the combined command to the drive [*a request must complete prior to starting the next*; col. 12, lines 26-28].

However, Jeffries does not specifically teach each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium, the SGL being configured to include data pointers; and examining the CDB and SGL as recited in the claim.

McDonald discloses each read and write command includes a command data block (CDB) and a scatter gather list (SGL), the CDB being configured to identify the location of a file on the storage medium [col. 5, lines 8-18], the SGL being configured to include data pointers; and examining the CDB and SGL [col. 9, lines 40-43; col. 10, lines 1-4] for providing a high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation (col. 17, lines 36-41). Since the technology for implementing a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) was well known, and since a command data block (CDB) and a scatter gather list (SGL) provides a high degree of performance, an artisan would have been motivated to implement a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) in the system of Jeffries. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) because a plurality of commands including a command data block (CDB) and a scatter gather list (SGL) were well known to benefit with providing a high degree of performance by generating and transmitting appropriate packets and specifying a disk transfer operation as taught by McDonald.

However, Jeffries and McDonald do not specifically teach a computer readable media having program instructions for performing the steps of claim 17. However, one of ordinary skill in the art would have recognized that a computer readable medium (i.e., floppy, CD-ROM, etc.) carrying program instructions for implementing a method is generally well known in the art, because it would have facilitated the transportation and installation of the method on other systems. For example, a copy of the Microsoft Windows operating system can be found on a CD-ROM from which Windows can be installed onto other systems, which is a lot easier than running a long cable or hand typing the software into another system. The examiner takes Official Notice of this teaching. Therefore, it would have been obvious to one of ordinary skill in the art to put Jeffries and McDonald's program on a computer readable medium, because it would have facilitated the transporting, installing and implementing of Jeffries and McDonald's program on other systems.

As per claim 18, Jeffries discloses further including program instructions for providing a multithread environment [*multiple outstanding I/Os occur concurrently on each logical drive*; col. 29, lines 13-15].

As per claim 20, Jeffries discloses the drive is a hard drive [*accessing a byte stored in a hard disk drive*; col. 2, lines 22-45].

7. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeffries (US5,974,544) and McDonald et al (US6,138,176) and further in view of Chisholm et al (US5,802,546).

As per claims 6 and 16, the combination of Jeffries and McDonald and Chisholm discloses the claimed invention as detailed above per claims 3 and 15 in the previous paragraphs.

However, Jeffries and MacDonald does not specifically teach the SGL of a combined command is expanded from the SGL of a non-combined command as recited in the claims.

Chisholm further discloses the SGL of the combined command is expanded from the SGL of a non-combined command [*during a scatter/gather operation on both sides, data gathered on one side equals data scattered on the other side*; col. 5, line 58 – col. 6, line 14].

It would have been obvious to one of ordinary skill in the art, having the teachings of Jeffries and McDonald and Chisholm before him at the time the invention was made, to modify the system of Jeffries to include SGL of the combined command expanded from the SGL of a non-combined command because it would have improved memory utilization and facilitated data transfer by providing concurrent scatter/gather operation on both sides and by minimizing processing unit intervention in data block transfers [col. 13, lines 26-31] as taught by Chisholm.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeffries (US5,974,544) and McDonald et al (US6,138,176) and further in view of Row et al (US5,802,366).

As per claim 5, the combination of Jeffries and McDonald discloses the claimed invention as detailed above in the previous paragraphs. However, Jeffries and MacDonald do not specifically teach the combined command is transparent to the operating system as recited in the claim.

Row discloses the concept of processing command transparent to the operating system [col. 8, lines 28-32].

It would have been obvious to one of ordinary skill in the art, having the teachings of Jeffries and McDonald and Row before him at the time the invention was made, to modify the system of Jeffries and McDonald to include a combined command is transparent to the operating system because it would have improved file server performance by eliminating the operating system from virtually all network, file and storage processing as taught by Row.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 2, 4-8, 10-14, 16-18 and 20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is required under 37 C.F.R. § 1.111 (c) to consider these references fully when responding to this action. The documents cited therein teach combining like commands in a queue for processing to contiguous file, multithreaded processing and scatter/gather operation and commands including a command data block (CDB) and a scatter gather list (SGL).

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pierre M. Vital whose telephone number is (703) 306-5839. The examiner can normally be reached on Mon-Fri, 8:30 am - 6:00 pm, alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mano Padmanabhan
3/18/04

Pierre M. Vital
Art Unit 2188
March 13, 2004

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TC2100